MULTIMEDIA UNIVERSITY

STUDENT ID NO

VENUE : _____

SEAT NO : _____

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2022/2023 (TERM ID 2210)

DCP 5101 – PROGRAM DESIGN

(All sections / Groups)

15 FEB 2023
9.00 a.m. – 11.00 a.m.
(2 Hours)

Question	Mark
1	**/12**
2	**/8**
3	**/10**
4	**/10**
Total	

INSTRUCTIONS TO STUDENT

1. This question paper consists of 9 printed pages (including cover page).

2. Attempt all questions. The distribution of the marks for each question is given.

3. Print all your answers **CLEARLY** in the specific answer box provided for each question. Submit this question paper at the end of the examination.

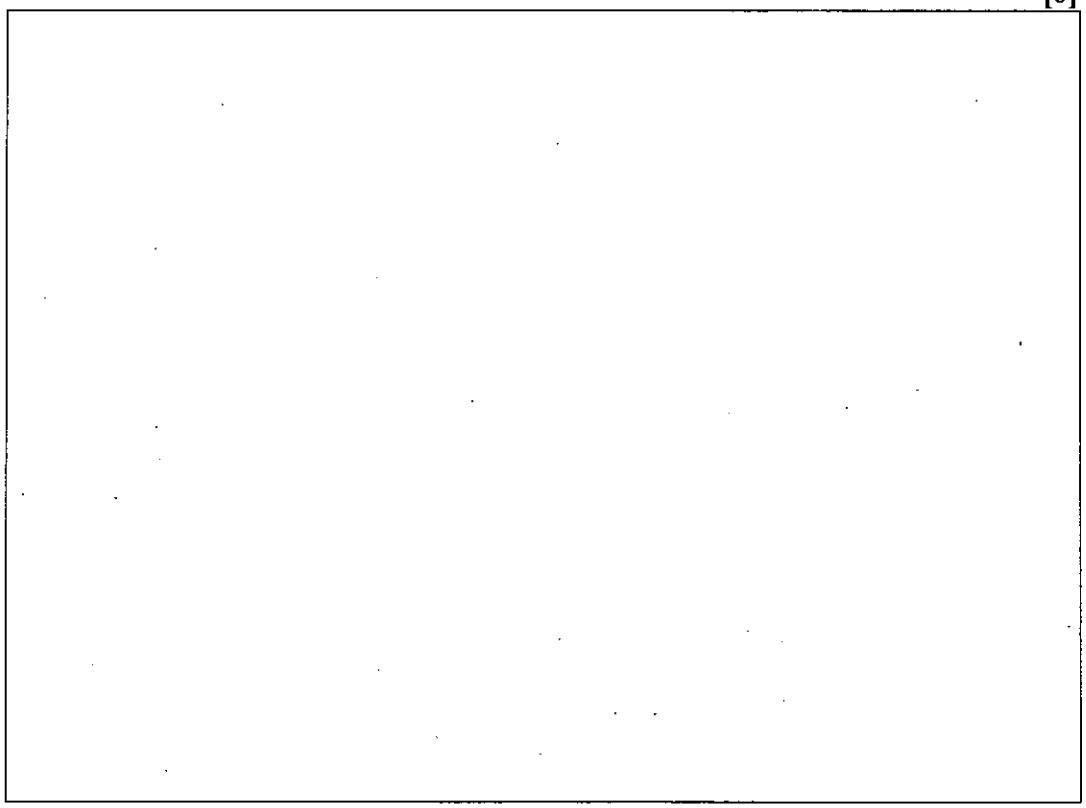
Question 1 [12 marks]

Q1(a). Draw a flowchart of a program that will accept ten positive integers and then display how many odd numbers and how many even numbers have been entered. Assume that the user will enter only positive integers.

Sample Run 1:

```
Enter ten positive integers.
2
4
2
3
5
2
3
7
8
10
6 even numbers. 4 odd numbers.
```

[6]



Q1(b). Write a complete program for the flowchart drawn in Q1(a) .

[6]

Continued...

Question 2 [8 marks]

Q2(a). Convert the following expression into a C statement:

$$W=\frac{(x^2-y)}{(4a+x)}$$

[1]

Q2(b). The program below accepts a positive integer and displays an output pattern 'C'. Declare and define the function cPattern() so that the program works as intended.

Sample Run 1:
```
Enter N: 5
*****
*
*
*
*****
```

Sample Run 2:
```
Enter N: 3
***
*
***
```

Sample Run 3:
```
Enter N: 2
**
**
```

Sample Run 4:
```
Enter N: 1
*
```

[7]

```
#include <stdio.h>

// cPattern() function prototype
// Write your code from here



int main()
{
  printf( "Enter N: " );
  int n;
  scanf( "%d", &n );
```

Continued...

```
  cPattern(n);
  return 0;
}

// cPattern() function definition
// Write your code from here
```

Continued...

Question 3 [10 marks]

Q3(a). What is the maximum length of a C string that can be placed in the string variable declared by the following declaration? Why?

```
char s[ 7 ];
```

[2]

Q3(b). Complete the program below which gets a phrase from the user, stores it in a C string and then displays the phrase one character at a time.

Note that the function strlen() cannot be used because the library for strlen() is not included.

In the sample output below, character number 9 is the new line character. fgets() gets the entire line including the new line character.

Sample Run 1:

```
Enter a phrase of no more than 79 characters:
Well done!
The sentence you entered is:
0 : W
1 : e
2 : l
3 : l
4 :
5 : d
6 : o
7 : n
8 : e
9 :
```

[4]

```
#include <stdio.h>

int main()
{
  char line[ 80 ];
  int count = 0;

  puts( "Enter a phrase of no more than 79 characters:");
  fgets( line, 80, stdin );

  printf( "The phrase you entered is %s\n", line );

  // Write your code from here
```

Continued...

```
   return 0;
}
```

Q3(c). calcTime is a data structure that contains three member variables of type int: hour, minute, second. Assume that we are using the 24-hour notation.

Complete the program below which
i. Sets **a** to 10:30:30 AM.
ii. Displays **a**
ii. Displays the number of minutes which has past since midnight.

Sample Run 1:
```
The time is 10:30:30
It is 630 minutes past midnight.
```

[4]

```
#include <stdio.h>

struct calcTime
{
   int hour;
   int minute;
   int second;
};

int main()
{
   struct calcTime a;

   // Write your code from here









   return 0;
}
```

Continued...

Question 4 [10 marks]

Q4(a). Fill in the blanks in the following program that uses a pointer to display the contents of an array.

[3]

```
#include <stdio.h>

int main()
{
   const int SIZE = 8;
   int set[ 8 ] = {2, 4, 6, 8, 10, 12, 14, 16};
   ________ numPtr;       // Declare the data type of numPtr

   numPtr = set;

   puts( "The numbers are:" );
   for (int count = 0; count < 8 ; count++ )
   {
      printf(_____________________________________________);

      ____________________;
   }
   puts("");
   return 0;
}
```

Q4(b). Implement mySwap() which swaps the values of two integer variables.

Sample Run 1:

```
a = 22     b = 77
a = 77     b = 22
```

[5]

```
#include <stdio.h>

// Function prototype
// Write your code from here



int main()
{
  int a = 22;
  int b = 77;

  printf( "a = %d   ", a );
  printf( "b = %d\n", b );

  mySwap( &a, &b );

  printf( "a = %d   ", a );
  printf( "b = %d\n", b );

  return 0;
}
```

Continued...

```
// Function definition
// Write your code from here
```

Q4(c). Fill in the blanks in the following program that reads five numbers from the keyboard and store them in a text file numbers.txt.

Sample Run 1:

```
Enter number 1 :2
Enter number 2 :3
Enter number 3 :1
Enter number 4 :4
Enter number 5 :5
```

The text in numbers.txt at the end of the program :

```
2
3
1
4
5
```

[2]

```
#include <stdio.h>

int main(void)
{
   FILE *fPtr = NULL;
   _____ = fopen( "_________________", "w" );
   int a;

   for( int i = 1; i <= 5; ++i )
   {
      printf( "Enter number %d :", i );
      scanf( "%d", &a );
      fprintf( _____, "%d\n", a );
   }

   fclose( _____ );
   return 0;
}
```

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